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Examination of teacher candidates' problem solving skills according to several variables

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Abstract

This research which has been carried out with the students of Sakarya University Educational Faculty, Guidance and Psychological Consulting , Department of Mental Disabled Teaching and Pre-School Teaching aims at presenting the problem solving skills of teacher candidates. The population of this research is formed of students of Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching. The sample of the research has been determined with aimed sampling method, it is formed of 297 students in these departments The collected data has been transferred to SPSS and average, Standard deviation, relative change coefficient, t-test and one way variance analysis statistical procedures have been realized. It has been determined that there is not a meaningful relationship between the departments of the teacher candidates, their levels, genders and problem solving skills.

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Keywords: Problem, Problem Solving, Problem Solving Skill, teacher candidates

1. Introduction

The problems confront individuals by getting more complex and different in the societies where everything changes rapidly and gets more complex. As the individuals face several problems continuously, individual lives get meaning with the solution of these problems. (Üstün ve Bozkurt, 2003; Büyükkaragöz and Çivi 1999). Because of these reasons, it is difficult to separate problems and life (Heppner, Witty and Dixon, 2004).

Problem is stated as situations which the individual cannot solve with present information when there are barriers preventing reaching the requested aims of the individual. (Bransford and Stein 1984; Açıkgöz 2006)

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Heddens and Speer (1997) state that problem is generally defined as mathematical problems based on four operations given at the end of the subjects in elementary school mathematics course books, but problem concept has a larger meaning. The events, facts or individuals who are difficult to be solved are problems. Morgan (1995) defines problem as a conflict where the individuals meet a prevention in reaching his objectives. Kalaycı (2001) thinks it as a situation whose result is indefinite and very difficult. According to him, when an individual is asked something, the thing which he cannot reply is a problem.

According to Bingham (1998), problem solving is a process requiring a series of aims related to moving some difficulties to reach a definite aim. Morgan (1995) defines problem solving as finding the best solution to reach the barriers which have been met and a process which individual feels the problem since finding a solution to it. Heppner and Krauskopf (1987) used problem solving as synonymous with coping with the problem. Generally, as every difficulty which has to be moved out is a problem, it is required for the individuals to have problem solving skills and use these skills to continue their lives effectively in their daily lives, educational lives and in all life problems.

Problem solving skill is a skill which the individual has to be an individual, getting along with his environment, living a healthy life and protect his mental health (Güçlü, 2003). Generally individual life is full of daily problems and events full of creating stress. The events which create problem can be unimportant events such as losing his key, having problems with the neighbors as daily events; on the other hand they can be important events such as divorcing, being raped, being kicked off the work, and death of a loved person (Izgar, Gürsel, Kesici and Negiş, 2004). While some problems can be solved with the habits gained before, some of them can be solved with knowledge, experiences and skills of the individual. The problem which the individual face with can be overcome by individuals who have problem solving skills whether they are basic or complex. (Güzel, 2004).

Bruner who evaluates the student as an individual who solves the problem actively takes new learning-teaching process helping the students exploring manageable and solvable problems. (Balay, 2004). Because, to what extent the individual solves the problems he faces , he gets succeed in orientation to life. This orientation has an importance to determine his status and place in the society (Üstün ve Bozkurt, 2003). Also problem solving skill is a teachable skill which helps finding meaningful solutions to the individuals' problems, (Conger, Rueter&Elder, 1999) problem solving skill should be given to all students in the educational system.

Problem solving is an important subject which has been an interest for long years. Problem solving skill of the individual and perception of problem solving skills show that they are effected from negative sense of self and idea and emotions about the future they have (Ağır,2002). Whereas researchers such as Gagne and Skinner (1964; 1974) are inclined to examine the individual's past as an important variable in problem solving process, researchers such as Kohler and Maier (1970) defend that the way of perceiving the situation which the individual faces is the most important element in problem solving skill. According to Burger (2006), Pervin (1996) and Ağır (2007), problem solving is a work of effort, time and exam. It is related with the aim, need, value, belief, attitude and habit of the individual. Also, inclination of the individual to problem solving is related with his wish, courage and self-confidence. The individuals who have problem solving skills have the features of being entrepreneur without having any anxiety against the events, the skill of creative thinking, self-confidence emotion and objective point of view. (Otacıoğlu, 2007).

When the literature is examined, there are many researches in or out of the country realized on problem solving skills of the individuals at different age groups and several educational levels. Forgatch (1989) in his research determined that the level of the students they are being educated effects their problem solving skills. Dündar (2009) who asserts that university education increases problem solving skills of the individuals could not find a relationship between male and female students' problem solving skills in his study in which he examined the relationship between the individual properties of university students and their problem solving skills . Also, when the classes of the university which the university students attend are taken into account, it has been determined that problem solving skills of the students at fourth grade is higher than the ones in other grades. Taylan (1990) in his study determined that there is not a meaningful difference between the students' department, class levels and genders at their problem solving skills, but there is a meaningful difference according to the curriculum. Güçray (2003) in his research determined that there is not a meaningful relationship between gender and problem solving skills. Genç and Kalafat (2010) determined that there is not a meaningful difference between problem solving skills of teacher candidates according to gender and educational type, problem solving skills of 3rd grade students is higher than 4th grade students. Also these researchers reached a result that the teacher candidates at Classroom teacher departments have more problem solving skills than the teacher candidates at Turkish Teaching, Science Teaching and English

Teaching Departments. Soyer and Bilgin (2010) determined that there is not a meaningful difference according to gender, age and grades about problem solving skill perceptions of the students of university students but there is a meaningful difference according to the departments they attend. In a research which Aylar and Aksin (2011) realized on teacher candidates of Social Sciences Teaching, they determined that there is not a meaningful difference between the graduated high school, grade and problem solving skills. Yenice (2012) examined self-competence levels and problem solving skills of teacher candidates at Science teaching, Social Sciences teaching and Classroom Teaching departments. He determined that there is not a meaningful difference in problem solving skills according to the grades they take education , their gender and graduated high school of teacher candidates but there is a meaningful difference according to the departments they take education. According to the research results, it has been determined that there is difference in favor of Science teachers between Science teachers and Social Science teachers. Alver (2005) examined problem solving skills of university students and their academic success according to several variables in his research and determined that there is not a meaningful difference between problem solving skills and their location where they live mostly in their lives, their gender, their departments and socio-economic situation. He determined that there is a meaningful difference in problem solving skills of teacher candidates according to their departments, education style and classroom levels. When they are examined according to their classroom levels, it has been determined that fourth grade students have higher problem solving skills than the other students at other levels. It has been determined that the teacher candidates at first education have higher problem solving skills than second education teacher candidates and Social Sciences teacher have more problem solving skills than the students at Chemistry and Psychological Guidance and Consulting.

1.1. The aim of the research

The aim of this research is to examine problem solving skills of teacher candidates at educational faculties in the context of several variables. Answers to the sub problems below will be looked for to reach this aim:

1. At what level is problem solving skills of the teacher candidates?
2. Is there a meaningful relationship between the teacher candidates' problem solving skills according to several variables (gender, educational type, their department, class and graduated high school)?

1.2. The importance of the research

This research has been realized on the students of Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching. The reason for selecting these departments is these students' target group shows difference to other departments. Especially the people employed at psychological consulting and guidance face with many problematic situations in their jobs in addition to their private lives (Özer, 1998; Paksoy, 2003; Ross, Altmaier and Russel, 1989). In addition to the ones being educated in psychological consulting and guidance , students graduated from Pre-school teaching and mental disability teaching should be taken into account when the student group they would be in relationship after they have been employed , it is expected to have their problem solving skills higher. Because of this reason, the research seems to be important in presenting problem solving skills of the teacher candidates being educated in these fields.

1.3. Limitations

This research is limited with the students of Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching. It is accepted that the participants replied questionnaire sincerely and clearly.

2. Method

2.1. The model of the research

This research has been realized with a survey model which aims at presenting the problem solving skills of the students at Sakarya University Educational Faculty, Guidance and Psychological Consulting, Department of Mental Disabled Teaching and Pre-School Teaching. Survey research model is a research approach aiming at describing a

situation at present or in the past with its existent position (Karasar,2004).

2.2. Population of the research

The population of the research includes 1284 people from the students of first and second education of Sakarya University Educational Faculty, Guidance and Psychological Consulting Department, Department of Mental Disabled Teaching and Pre-School Teaching in 2013-2014 semester. In 2013-2014 semester, totally 550 students at Guidance and Psychological Consulting Department, totally 410 students at Pre-School Teaching and totally 324 students at Department of Mental Disabled Teaching are being educated.

2.3. Sample of the Research

The sample of the research has been determined by aimed sampling method. A sample formed of 312 students as "104" from Pre-School Teaching (PT), "104" from Guidance and Psychological Consulting Department (GPC), "104" from Department of Mental Disabled Teaching (MDT) has been created. However, because of the reasons such as deficient replies in the scales. Giving more than one answer to the questions, 15 scales have been omitted from the application. As a result, the data taken from 297 students are taken into evaluation. Representation rate of the sample is approximately % 23.

2.4. Data collection instruments

Likert type "Problem Solving Inventory" which includes 35 items and scored between 1-6 and which has been adapted to Turkish by firstly Taylan (1990) and later adapted as a final version in Turkish by Şahin, Şahin and Heppner (1993) and has been developed as a data collection method by Heppner and Peterson (1982) has been used. During scoring, 8th, 22nd and 29th items are not included in the calculation and "1, 2, 3, 4, 11, 13, 14, 15, 17, 21, 25, 26, 30 and 34th items are the ones which have been calculated in opposite way and it is accepted that these items represent adequate problem solving skills. In this situation, the minimum score to be taken from the scale is 32, the highest one is 192. The height of the score taken from the scale shows that the individual perceives himself he does not have an adequate problem solving skill. According to this, the ones having 32-80 points have high problem solving skills, the ones who have points between 81-192 have low problem solving skills. The replies to be given to the items are "I always behave like this", "I almost behave like this", "I frequently behave like this", "I sometimes behave like this", "I rarely behave like this" and "I never behave like this". (Savaşır and Şahin, 1997).

2.5. Data analysis

Descriptive statistical procedures (average, standard deviation and relative change coefficient) in data analysis and one-way variance analysis for comparing more than two groups have been realized. T-test has been used for free groups to compare their averages.

3. Findings

Table 1. Findings related to demographical properties of teacher candidates

Properties		f	%	Properties		f	%
Gender	Female	220	74,07	Grade	1. grade	115	38,7
	Male	77	25,9		2. grade	70	23,5
	Total	*297*	*100,0*		3. grade	73	24,5
Department	GPC	102	34,3		4. grade	71	23,9
	MDT	97	32,6		*Total*	*297*	*100,0*
	PT	98	32,9	High School type	Science Hi. Sc.	0	0
	Total	*297*	*100,0*		Anatolian Hi. Sc.	117	39,39
Education type	I. education	158	53,1		Anat. Teac. Hi. Sch	48	16,16
	II. education	139	46,8		Gen. Hi. Sch.	58	19,15
	Total	*297*	*100,0*		Others	74	24,9
					Total	*297*	*100,0*

Information related to the teacher candidates taking place in the sample are given in Table 1. 220 of the candidatesare female (%74,07), 77 of them male (%25,9), 102 of them (%34,3) in Guidance and Psychological Consulting Department, 97 of them (%32,6) in Pre-School Teaching and 98 of them (%32,9) have been educated in Department of Mental Disabled Teaching. 115 of the students are (%38,7) at first grade, 70 of them (%23,5) have been in the second grade, 73 of them (%24,5) are in the third grade and , 71 of them have been in the fourth grade (%23,9) and 117 of them have been graduated from Anatolian High School (%39,39), 48 of them have been graduated from Anatolian Teacher High School (%16,16), 58 of them have been graduated from High School (%19,15), and others 74 of them have been graduated from other types of high schools . There are not any students graduated from Science high Schools. 158 of these students are from 1st education (%53,1), 139 of these students are from 2nd education (%46,8) .

3.1. Findings related to Firs Sub Problem

Reply to the question of "At what level are the problem solving skills of the teacher candidates" has been looked for and statistics related to this are given in Table 2.

Table 2. Problem solving skills of the teacher candidates

	N	$\overline{X}$	sd	V%
Total	297	114,6465	15,41519	13,45

At the result of the descriptive statistics taken according to the data from 297 teacher candidates, averagely ($\overline{X}$) "114,6465", standard deviation "15,41519" and relative change coefficient (V%) "13,45" have been taken. It can be stated according to these data that the teacher candidates have a low problem solving skill level relevant to the evaluation of the scale (81-192 points gap states low problem solving skills). Because of being relative change coefficient lower than "% 25, it has been determined that the teacher candidates did not show more distribution from this average, in other words they have been in agreement.

3.2. Findings related to Second Sub-problem

Reply to the question of "Is there a meaningful relationship between the teacher candidates' problem solving skills according to several variables (gender, educational type, their department, class and graduated high school)" has been looked for and statistics related to this are given in Table 3 and Table 4 in the second sub problem of the research.

Table 3. t-test results

Free variable		N	$\overline{X}$	sd.	V%	t	df	p
Gender	Female	220	115,19	15,057	13,07	1,029	295	0,304
	Male	77	113,09	16,40	14,50			
Educational type	I. education	158	114,01	13,28	11,65	0,755	295	0,451
	II. education	139	115,37	17,55	15,21			

*P<0,05

1. Problem solving skills of teacher candidates according to their gender

When the teacher candidates' problem solving skills are examined according to their gender, as "t=1,029" and "p=0,304" values have been taken from t-test in Table 3, it has been determined that there is not a meaningful relationship at "p<0,05" level. Also when relative change coefficients have been examined (V%), it has been determined that relative change coefficient of every two group has been lower than "%25" , in other words it has been determined that the distribution does not show difference from the average.

2. Problem solving skills of teacher candidates according to their educational types

When t-test results realized according to the educational type from Table 3, it can be seen that "t=0,755" and "p=0,451" values are taken. According to these values "p<0,05", it has been determined that there is not a meaningful difference between problem solving skills of teacher candidates and their educational types. As relative change coefficient of every two group has been lower than "%25", it has been determined that the distribution does not show difference from the average.

Table 4. One-way variance analysis (One-Way ANOVA) Results

Dependent variables		Squares Toplamı	Sd	Squares Ort.	F	p
Department	Between groups	6,334	2	3,167	,013	,987
	In the groups	70331,545	294	239,223		
	Total	70337,879	296	242,39		
Class	Between groups	500,377	3	166,792	,700	,553
	In the groups	69837,501	293	238,353		
	Total	70337,879	296	405,145		
Graduated high sch.	Between groups	555,895	3	185,298	,778	,507
	In the groups	69781,983	293	238,164		
	Total	70337,879	296	423,462		

P<0,05

3. Problem solving skills of teacher candidates according to their Departments

When one way variance analysis results have been examined in Table 4, it has been determined that there is not a meaningful difference between problem solving skills of teacher candidates and their departments (F=0,013, p=0, 987).

4. Problem solving skills of teacher candidates according to their classes

It has been determined that there is not a meaningful difference between problem solving skills of teacher candidates and their classroom level (F=0,345, p=0,847), as it can be seen in Table 4, there is not a meaningful difference at "p<0,05" level.

5. Problem solving skills of teacher candidates according to their graduated high schools

When one way variance analysis results have been examined from table 4 in order to determine the relationship between problem solving skills of teacher candidates and their graduated schools, there is not a meaningful difference at "p<0,05" level between their problem solving skills and their graduated high schools (F=0,778, p=0, 507) .

4. Discussion, Result and Proposals

4.1. Results and Discussion

Problem solving skills of university students have been examined in the frame of gender, class, department, graduated high school and educational type in this research.

Any meaningful difference could not be found at the result of comparing gender of the teacher candidates and their problem solving skills. This result emphasizing there is no difference between gender and problem solving skills is covered with the studies of Yenice (2012), Güçray (2003), Saygılı (2000), Taylan (1990), Genç ve Kalafat (2010) Yıldırım and Yalçın (2008), Alver (2005), Dündar (2009), Soyer and Bilgin (2010), Aylar and Aksin's studies (2011), it does not correspond with the studies of Ayaydın and Özbay (2003), Tamres, Janicki, and Helgeson (2002). According to Ayaydın and Özbey (2003) and Tamres, Janicki, and Helgeson (2002), the females' problem solving skills is higher than the males. Soyer and Bilgin (2010) relates this result with the females' entering business

world more and the change in the families' attitude while training their children.

According to the research findings, problem solving skills of teacher candidates show a meaningful difference according to their departments. The result taken shows a parallelism with the researches of Genç and Kalafat (2010), but it has been in conflict with Yenice (2012), Alver (2005), Otacıoğlu (2007) and Taylan's (1990) researches. Yenice (2012) determined that Science teacher candidates have more problem solving skills than Social Sciences teacher candidates. According to Alver's (2005) research the university students at Social Sciences have more problem solving skills than the students attending at GPC and Chemistry Departments. Otacıoğlu (2007) has determined that the teacher candidates at Music department have more problem solving skills than the ones at GPC. Taylan (1990) determined that there is a difference according to the program being educated in problem solving perception. It can be thought that the reason for the difference between problem solving skills according to the educational program is sourced from the limitation of GPC, Pre-School Teaching and Mental Disabled Teaching in the research we made.

Another result taken from the research is that there is a meaningful difference in problem solving skills of teacher candidates according to class level of them. This result corresponds with the results Yenice (2012), Aylar and Aksin (2011), Taylan (1990) and Serin (2004). According to Serin (2004), problem solving skills of teacher candidates increase in upper class levels, but this increase does not exhibit a meaningful difference. But Genç and Kalafat (2010), Alver (2005) Dündar (2009), Forgatch (1989), Katkat and Mızrak (2003) state that there is a meaningful difference between class level and problem solving skills of teacher candidates. According to Alver (2005) research, problem solving skills of fourth grade students is higher than the other ones. Whereas Dündar (2009) determines that problem solving skills of fourth grade students is higher than the lower classes, Genç and Kalafat (2010) have determined that third grade students' problem solving skills is higher than fourth grade students. They claimed that this situation is related with the concern of fourth grade students for future more. However the literature does not show a parallelism in not changing problem solving perception related with the class level in this research. This situation can be claimed that the university students' age are close to each other and include the same period as Soyer and Bilgin(2010) stated .In another point of view, it can be thought that against Dündar's (2009) statement, and parallel with Soyer and Bilgin's (2010) statements, the years spent in the university do not create a difference in problem solving success.

There is not a meaningful difference in problem solving skills of teacher candidates according to their educational types. In the same way; Aylar and Aksin (2011), Yıldırım and Yalçın (2008), Çam (1997), Saygılı (2000), Nezu (1985), Basmacı (1998), Aydın (1999), Terzi (2000), Korkmaz (2002), Taşdemir (2003), Pehlivan and Konukman (2004), Genç and Kalafat (2010) reached the result that there is not a meaningful difference in problem solving skills of teacher candidates according to their educational types. This finding reached at the end of the result shows a parallelism with the findings of the research above but it shows difference with Alver's (2005) research results. According to Alver, the students at first education have more problem solving skills than the students at second education.

Yenice (2012) could not find a difference in problem solving skills of teacher candidates who attend in Science, Social Sciences and Classroom Teaching according to their graduated high schools, also Buluç, Kuru, and Taneri (2010) could not find a difference in problem solving skills of teacher candidates who attend in Classroom Teaching. In the same way, it hass been determined in this research that there is not a meaningful difference between problem solving skills of teacher candidates of Guidance and Psychological Consulting , Department of Mental Disabled Teaching and Pre-School Teaching.

There is not a meaningful difference in problem solving skills of students in the context of gender, educational type, and graduated high school. Although the problem solving skills of students do not differentiate in the frame of these variables, it is seen that problem solving point average has been between 50-162. Total score to be taken from the scale can change between 32-192 , points between 32- 80 state high problem solving skills , the points between 81- 192 state low problem solving skills .In this context, as the teacher candidates average is "114,65" , their problem solving skills can be told at low level.

4.2. Proposals

1. The sample of the study is formed of teacher candidates. In this context, learning environments which provide opportunity for the teachers of the future to develop and gain problem solving skills during their university education can be provided for them.

2. The support given to the individuals for the development of problem solving skills has a great importance. This support is provided by promoting interest, discussing ideas, taking individual emotions into account and creating environments in which individualistic needs are taken into account (Bingham, 1998). In this context, creating relevant environments for university students to develop critical thinking, creativity and research is important. In the name of creating these conditions, groups in which the students will take place actively can be formed. While the students state themselves in these groups, it is important for them to develop their problem solving skills as there is a mass confirming and listening to them.

3. As problem solving skills of teacher candidates are found low, additions can be made in the content of the courses in educational faculties, any change can be realized about the systems which have been accepted as one measure in the academic success of the students. Thinking education, problem solving education, learning based on problem can be sustained in the programs by developing detailed programs related to developing problem solving skills by applying all these more systematically.

4. The research is formed of teacher candidates who take education Educational Faculty, Guidance and Psychological Consulting Department, Department of Mental Disabled Teaching and Pre-School Teaching. Researches can be realized whether there are differences between these students having education in these departments and other teacher candidates having education in another departments.

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